

WHAT IS CLAIMED IS:

1. A compound of the formula



I

wherein:

A¹ is a member selected from the group consisting of alkylene, alkenylene, alkynylene, cycloalkylene, cycloalkenylene, arylene, heteroarylene, heterocycloalkylene, and heterocycloalkenylene, or, alternatively, A¹ represents a single or double bond linking L¹ and L²;

L¹ and L² are each independently a member selected from the group consisting of O-, -S-, -N(R¹)-, -C(O)-, -C(O)N(R¹)-, -O-alkylene-, -S-alkylene-, -N(R¹)-alkylene, -C(O)-alkylene, -C(O)N(R¹)-alkylene, -C(O)-O-alkylene, alkylene, alkenylene, alkynylene, cycloalkylene, cycloalkenylene, arylene, heteroarylene, heterocycloalkylene, and heterocycloalkenylene;

B¹ and B² are each independently a member selected from the group consisting of alkyl, cycloalkyl, cycloalkenyl, aryl, heteroaryl, heterocycloalkyl, and heterocycloalkenyl;

alternatively, L¹ can be additionally linked to B¹ via a group X¹ to form a 5-9 member ring; and L² can be additionally linked to B² via a group X² to form a 5-9 member ring;

X¹ and X² are each independently a member selected from the group consisting of -O-, -S-, -N(R²)-, -C(O)-, -C(O)N(R²)-, -O-alkylene, -S-alkylene, -N(R²)-alkylene, -C(O)-alkylene, -C(O)N(R²)-alkylene, and -C(O)-O-alkylene; and

R¹ and R² are each independently a member selected from the group consisting of hydrogen, alkyl, heteroalkyl, cycloalkyl, heterocycloalkyl, cycloalkenyl, heterocycloalkenyl, aryl, heteroaryl, arylalkyl, aryl(heteroalkyl), (heteroaryl)alkyl, and (heteroaryl)heteroalkyl.

2. The compound of claim 1, wherein

A¹ is a member selected from the group consisting of (C₁-C₈)alkylene, arylene, heteroarylene and a single bond;

L¹ and L² are each independently a member selected from the group consisting of -C(O)- and -C(O)N(R¹)-;

6 R¹ is a member selected from the group consisting of (C₅-C₈)cycloalkyl,
7 aryl, heteroaryl, aryl(C₁-C₄)alkyl, and (heteroaryl)(C₁-C₄)alkyl; and

8 B¹ and B² are each independently a member selected from the group
9 consisting of aryl, heteroaryl, aryl(C₁-C₄)alkyl, (heteroaryl)(C₁-C₄)alkyl, (C₁-C₈)alkyl,
10 and (C₅-C₈)cycloalkyl.

1 3. The compound of claim 1, wherein

2 A¹ is a member selected from the group consisting of (C₁-C₈)alkylene,
3 phenylene, divalent pyridine and a single bond;

4 L¹ and L² are each independently a member selected from the group
5 consisting of -C(O)- and -C(O)N(R¹)-;

6 R¹ is optionally substituted (C₅-C₈)cycloalkyl, optionally substituted
7 phenyl, optionally substituted benzyl, and (C₁-C₈)alkyl; and

8 B¹ and B² are each independently a member selected from the group
9 consisting of optionally substituted (C₅-C₈)cycloalkyl, optionally substituted phenyl, and
10 optionally substituted benzyl.

1 4. The compound of claim 1, wherein

2 A¹ is a member selected from the group consisting of alkylene, arylene,
3 heteroarylene and a single bond;

4 L¹ and L² are each -C(O)N(R¹)-;

5 R¹ is a member selected from the group consisting of aryl, heteroaryl,
6 arylalkyl, and (heteroaryl)alkyl; and

7 B¹ and B² are each independently a member selected from the group
8 consisting of aryl, heteroaryl, arylalkyl, (heteroaryl)alkyl, alkyl, and cycloalkyl.

1 5. The compound of claim 1, wherein

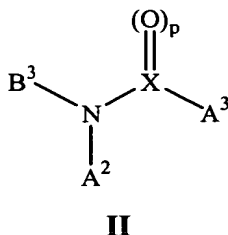
2 A¹ is a heteroarylene group containing two fused rings;

3 L¹ and L² are each independently a member selected from the group
4 consisting of -O-, -NH-, and -N(R¹)-;

5 R¹ is a member selected from the group consisting of alkyl and
6 heteroalkyl; and

7 B¹ and B² are each independently a member selected from the group
8 consisting of aryl, heteroaryl, arylalkyl, (heteroaryl)alkyl, alkyl, and cycloalkyl.

6. A compound of the formula



wherein:

A^2 and A^3 are each independently a member selected from the group consisting of alkyl, heteroalkyl, cycloalkyl, heterocycloalkyl, cycloalkenyl, heterocycloalkenyl, aryl, heteroaryl, arylalkyl, (heteroaryl)alkyl, aryl(heteroalkyl), and (heteroaryl)heteroalkyl;

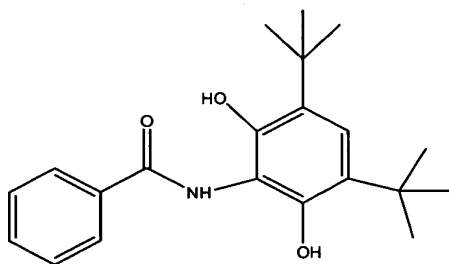
B^3 is a member selected from the group consisting of hydrogen, -alkylene- $\text{C}(\text{O})\text{R}^3$, $-\text{C}(\text{O})\text{R}^3$, alkylene- $\text{C}(\text{O})\text{N}(\text{R}^3\text{R}^4)$, $-\text{C}(\text{O})\text{N}(\text{R}^3\text{R}^4)$, alkylene- $\text{S}(\text{O})_n\text{N}(\text{R}^3\text{R}^4)$, $-\text{S}(\text{O})_n\text{N}(\text{R}^3\text{R}^4)$, alkylene- $\text{N}(\text{R}^3\text{R}^4)$, alkylene- OR^3 , and $-\text{C}(\text{O})\text{OR}^3$;

R^3 and R^4 are each independently a member selected from the group consisting of hydrogen, alkyl, heteroalkyl, cycloalkyl, heterocycloalkyl, cycloalkenyl, heterocycloalkenyl, aryl, heteroaryl, arylalkyl, (heteroaryl)alkyl, aryl(heteroalkyl), and (heteroaryl)heteroalkyl;

X is a member selected from the group consisting of C, S, and N; and

the subscripts n and p are each independently an integer from 0-2,

provided that the following compound is excluded:



7. The compound of claim 6, wherein

A^2 and A^3 are each independently a member selected from the group consisting of aryl and heteroaryl;

B^3 is a member selected from the group consisting of alkylene- $\text{C}(\text{O})\text{N}(\text{R}^3\text{R}^4)$, and alkylene- $\text{S}(\text{O})_n\text{N}(\text{R}^3\text{R}^4)$;

wherein R^3 is arylalkyl or (heteroaryl)alkyl;

7 R^4 is hydrogen;

8 X is S; and

9 n is 2.

1 8. The compound of claim 6, wherein

2 A^2 is an aryl group substituted *ortho* to the nitrogen with a member
3 selected from the group consisting of $-OH$, $-NH_2$, $-NHC(O)$ -alkyl, $-NHSO_2$ -alkyl;

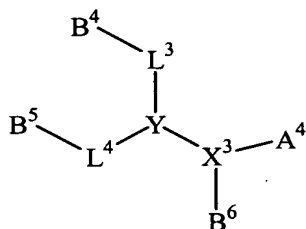
4 A^3 is a member selected from the group consisting of aryl and heteroaryl;

5 B^3 is hydrogen;

6 X is C; and

7 p is 1.

1 9. A compound of the formula:



III

4 wherein:

5 A^4 is a member selected from the group consisting of hydrogen, $-C(O)R^5$, -
6 $C(O)N(R^5R^6)$, $-S(O)_nN(R^5R^6)$, $-alkylene-N(R^5R^6)$, $-alkylene-OR^5$ and $-C(O)OR^5$;

7 L^3 and L^4 are each independently a member selected from the group
8 consisting of a single bond, $-C(O)-$, $-S(O)_p-$, and alkylene, wherein the subscript p is an
9 integer from 0-2;

10 B^4 , B^5 and B^6 are each independently a member selected from the group
11 consisting of hydrogen, alkyl, heteroalkyl, cycloalkyl, heterocycloalkyl,
12 fused-benzoheterocycloalkyl, cycloalkenyl, heterocycloalkenyl, aryl, heteroaryl,
13 arylalkyl, aryl(heteroalkyl), (heteroaryl)alkyl, and (heteroaryl)heteroalkyl;

14 alternatively, B^4 and B^5 join to form a divalent arylene, heteroarylene,
15 alkylene, or cycloalkylene linkage between L^3 and L^4 , and B^6 is a member selected from
16 the group consisting of hydrogen, alkyl, heteroalkyl, heterocycloalkyl, arylalkyl, or
17 (heteroaryl)alkyl.

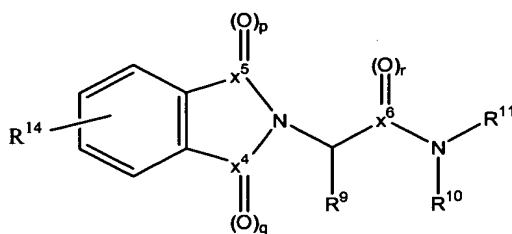
18 X^3 and Y are each independently a trivalent nitrogen atom or a trivalent or
19 tetravalent carbon atom; and

20 R⁵ and R⁶ are each independently a member selected from the group
21 consisting of hydrogen, alkyl, heteroalkyl, cycloalkyl, heterocycloalkyl, cycloalkenyl,
22 heterocycloalkenyl, aryl, heteroaryl, arylalkyl, aryl(heteroalkyl), (heteroaryl)alkyl, and
23 (heteroaryl)heteroalkyl.

1 10. The compound of claim 9, wherein
2 A⁴ is a member selected from the group consisting of hydrogen, -
3 C(O)N(R⁵R⁶) and -S(O)₂N(R⁵R⁶);
4 R⁵ and R⁶ are each independently a member selected from the group
5 consisting of alkyl, cycloalkyl, and heterocycloalkyl;
6 L³ and L⁴ are each independently a member selected from the group
7 consisting of -C(O)-, -S(O)₂-, and lower alkylene;
8 B⁴ and B⁵ join to form an arylene or heteroarylene linkage between L³ and
9 L⁴;
10 X is tetravalent carbon in the *R* configuration;
11 Y is trivalent nitrogen; and
12 B⁶ is a member selected from the group consisting of hydrogen, alkyl,
13 heteroalkyl, heterocycloalkyl, arylalkyl, or (heteroaryl)alkyl.

1 11. The compound of claim 9, wherein
2 A⁴ is a member selected from the group consisting of hydrogen, -
3 C(O)N(R⁵R⁶) and -S(O)₂N(R⁵R⁶);
4 R⁵ and R⁶ are each independently a member selected from the group
5 consisting of alkyl, cycloalkyl, and heterocycloalkyl;
6 L³ and L⁴ are each independently a member selected from the group
7 consisting of -C(O)-, -S(O)₂-, and lower alkylene;
8 B⁴ and B⁵ are each independently a member selected from the group
9 consisting of hydrogen, alkyl, arylalkyl, aryl, and heteroaryl;
10 X is tetravalent carbon in the *R* configuration;
11 Y is trivalent nitrogen; and
12 B⁶ is a member selected from the group consisting of hydrogen, alkyl,
13 heteroalkyl, heterocycloalkyl, arylalkyl, and (heteroaryl)alkyl.

1 12. The compound of claim 9, said compound having the formula



IIIa

wherein:

X^4 , X^5 and X^6 are each independently C or S;

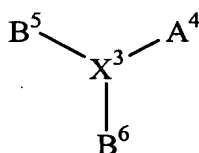
R^{10} and R^{11} are each independently alkyl, cycloalkyl, or heterocycloalkyl;

R^9 is an optionally substituted aryl, heteroaryl, arylalkyl, (heteroaryl)alkyl, heterocycloalkyl;

R^{14} is selected from hydrogen, halogen, alkyl, alkoxy, alkylamino, alkylthio, acyl, cycloalkyl and aryl; and

the subscripts p, q, and r are each independently integers from 0-2.

13. A compound of the formula:



IIIb

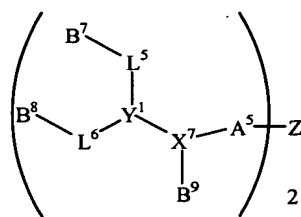
wherein:

A^4 is a member selected from the group consisting of hydrogen, $-C(O)R^5$, $-C(O)N(R^5R^6)$, $-S(O)_nN(R^5R^6)$, $-alkylene-N(R^5R^6)$, $-alkylene-OR^5$ and $-C(O)OR^5$;

B^5 and B^6 are members independently selected from the group consisting of hydrogen, alkyl, heteroalkyl, cycloalkyl, heterocycloalkyl, fused-benzoheterocycloalkyl, cycloalkenyl, heterocycloalkenyl, aryl, heteroaryl, arylalkyl, aryl(heteroalkyl), (heteroaryl)alkyl and (heteroaryl)heteroalkyl; and

X^3 is a trivalent nitrogen atom or a trivalent or tetravalent carbon atom.

14. A compound of the formula:



IV

wherein:

A⁵ is a member selected from the group consisting of -C(O)-, -alkylene-, -S(O)_n-, -C(O)N(R¹²)-, -S(O)₂N(R¹²)-, -alkylene-N(R¹²)-, -alkylene-O-, and -C(O)O-;

L⁵ and L⁶ are each independently a member selected from the group consisting of -C(O)-, -S(O)_n-, and alkylene, wherein the subscript n is an integer from 0-2;

B⁷, B⁸, and B⁹ are each independently a member selected from the group consisting of alkyl, heteroalkyl, cycloalkyl, heterocycloalkyl, benzoheterocycloalkyl, cycloalkenyl, heterocycloalkenyl, aryl, heteroaryl, arylalkyl, aryl(heteroalkyl), (heteroaryl)alkyl, and (heteroaryl)heteroalkyl;

alternatively, B⁷ and B⁸ join to form a divalent arylene, heteroarylene, alkylene, or cycloalkylene linkage between L⁵ and L⁶;

Z is a member selected from the group consisting of alkylene, heteroalkylene, cycloalkylene, and heterocycloalkylene;

X⁷ and Y¹ are each independently a trivalent nitrogen atom or a trivalent or tetravalent carbon atom; and

R¹² is a member selected from the group consisting of hydrogen, alkyl, heteroalkyl, cycloalkyl, heterocycloalkyl, cycloalkenyl, heterocycloalkenyl, aryl, heteroaryl, arylalkyl, aryl(heteroalkyl), (heteroaryl)alkyl, and (heteroaryl)heteroalkyl.

15. The compound of claim 14, wherein

A⁵ is a member selected from the group consisting of -C(O)-, -C(O)N(R¹²)- and -S(O)₂N(R¹²)-;

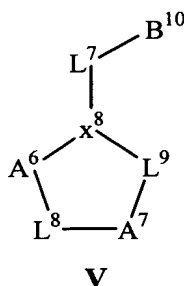
R¹² is a member selected from the group consisting of alkyl, cycloalkyl, and heterocycloalkyl;

B⁷ and B⁸ are joined in an arylene or heteroarylene linkage between L⁵ and L⁶;

B⁹ is a member selected from the group consisting of alkyl, heteroalkyl, heterocycloalkyl, arylalkyl, and (heteroaryl)alkyl;

10 Z is alkylene, heteroalkylene, or heterocycloalkylene;
 11 L^5 and L^6 are each independently a member selected from the group
 12 consisting of $-C(O)-$, $-S(O)_2-$, or lower alkylene;
 13 X^7 is tetravalent carbon; and
 14 Y^1 is trivalent nitrogen.

1 16. A compound of the formula:



2 wherein:
 3 A^6 and A^7 are each independently a member selected from the group
 4 consisting of arylene, heteroarylene, cycloalkylene, and heterocycloalkylene;
 5 B^{10} is a member selected from the group consisting of aryl, heteroaryl,
 6 arylalkyl, (heteroaryl)alkyl, alkyl, cycloalkyl, cycloalkenyl, heteroalkyl, heterocycloalkyl,
 7 and heterocycloalkenyl;
 8 L^7 , L^8 , and L^9 are each independently a member selected from the group
 9 consisting of $-O-$, $-S-$, $-N(R^{13})$, $-C(O)-$, $-S(O)-$, $-S(O)_2-$, alkylene, $-O$ -alkylene, $-S$ -
 10 alkylene, $-N(R^{13})$ -alkylene, $-C(O)$ -alkylene, $-C(O)N(R^{13})$ -alkylene, $-C(O)$ - O -alkylene, a
 11 single bond, and a double bond;
 12 X^8 is a member selected from the group consisting of N, and CR^{13} ; and
 13 R^{13} is a member selected from the group consisting of hydrogen, alkyl,
 14 heteroalkyl, cycloalkyl, heterocycloalkyl, cycloalkenyl, heterocycloalkenyl, aryl,
 15 heteroaryl, arylalkyl, and (heteroaryl)alkyl.

1 17. The compound of claim 16, wherein
 2 A^6 and A^7 are each independently a member selected from the group
 3 consisting of aryl, heteroaryl, cycloalkyl, and heterocycloalkyl;
 4 B^{10} is a member selected from the group consisting of aryl, heteroaryl,
 5 arylalkyl, and (heteroaryl)alkyl;
 6 L^7 and L^8 are each independently a member selected from the group
 7 consisting of $-C(O)-$, $-S(O)-$, and $-S(O)_2-$;

L⁹ is a member selected from the group consisting of -C(O)-, alkylene, and a single bond; and

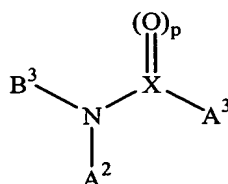
X⁵ is N.

18. A pharmaceutical composition, said pharmaceutical composition comprising:

- a) a compound of claim 1; and
- b) a pharmaceutically acceptable carrier or excipient.

19. A pharmaceutical composition, said pharmaceutical composition comprising:

- a) a compound of the formula



II

wherein:

A² and A³ are each independently a member selected from the group consisting of alkyl, heteroalkyl, cycloalkyl, heterocycloalkyl, cycloalkenyl, heterocycloalkenyl, aryl, heteroaryl, arylalkyl, (heteroaryl)alkyl, aryl(heteroalkyl), and (heteroaryl)heteroalkyl;

B³ is a member selected from the group consisting of hydrogen, -alkylene-C(O)R³, -C(O)R³, alkylene-C(O)N(R³R⁴), -C(O)N(R³R⁴), alkylene-S(O)_nN(R³R⁴), -S(O)_nN(R³R⁴), alkylene-N(R³R⁴), alkylene-OR³, and -C(O)OR³;

R³ and R⁴ are each independently a member selected from the group consisting of hydrogen, alkyl, heteroalkyl, cycloalkyl, heterocycloalkyl, cycloalkenyl, heterocycloalkenyl, aryl, heteroaryl, arylalkyl, (heteroaryl)alkyl, aryl(heteroalkyl), and (heteroaryl)heteroalkyl;

X is a member selected from the group consisting of C, S, and N; and the subscripts n and p are each independently an integer from 0-2; and

- b) a pharmaceutically acceptable carrier or excipient.

1 20. A pharmaceutical composition, said pharmaceutical composition
2 comprising:

- 3 a) a compound of claim 9; and
4 b) a pharmaceutically acceptable carrier or excipient.

1 21. A pharmaceutical composition, said pharmaceutical composition
2 comprising:

- 3 a) a compound of claim 13; and
4 b) a pharmaceutically acceptable carrier or excipient.

1 22. A pharmaceutical composition, said pharmaceutical composition
2 comprising:

- 3 a) a compound of claim 14; and
4 b) a pharmaceutically acceptable carrier or excipient.

1 23. A pharmaceutical composition, said pharmaceutical composition
2 comprising:

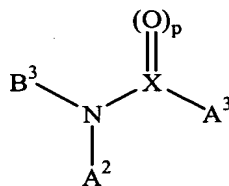
- 3 a) a compound of claim 16; and
4 b) a pharmaceutically acceptable carrier or excipient.

1 24. A method for treating a FXR-mediated disease in a mammal, said
2 method comprising:

3 administering a compound of claim 1, thereby treating a FXR-mediated
4 disease in a mammal.

1 25. A method for treating a FXR-mediated disease in a mammal, said
2 method comprising:

3 administering a compound of the formula



II

6 wherein:

7 A² and A³ are each independently a member selected from the group
8 consisting of alkyl, heteroalkyl, cycloalkyl, heterocycloalkyl, cycloalkenyl,
9 heterocycloalkenyl, aryl, heteroaryl, arylalkyl, (heteroaryl)alkyl, aryl(heteroalkyl), and
10 (heteroaryl)heteroalkyl;

11 B³ is a member selected from the group consisting of hydrogen, -alkylene-
12 C(O)R³, -C(O)R³, alkylene-C(O)N(R³R⁴), -C(O)N(R³R⁴), alkylene-S(O)_nN(R³R⁴), -
13 S(O)_nN(R³R⁴), alkylene-N(R³R⁴), alkylene-OR³, and -C(O)OR³;

14 R³ and R⁴ are each independently a member selected from the group
15 consisting of hydrogen, alkyl, heteroalkyl, cycloalkyl, heterocycloalkyl, cycloalkenyl,
16 heterocycloalkenyl, aryl, heteroaryl, arylalkyl, (heteroaryl)alkyl, aryl(heteroalkyl), and
17 (heteroaryl)heteroalkyl;

18 X is a member selected from the group consisting of C, S, and N; and
19 the subscripts n and p are each independently an integer from 0-2;
20 thereby treating a FXR-mediated disease in a mammal.

1 26. A method for treating a FXR-mediated disease in a mammal, said
2 method comprising:
3 administering a compound of claim 9, thereby treating a FXR-mediated
4 disease in a mammal.

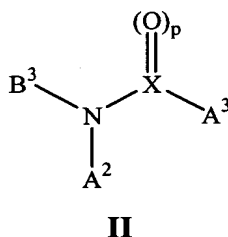
1 27. A method for treating a FXR-mediated disease in a mammal, said
2 method comprising:
3 administering a compound of claim 13, thereby treating a FXR-mediated
4 disease in a mammal.

1 28. A method for treating a FXR-mediated disease in a mammal, said
2 method comprising:
3 administering a compound of claim 14, thereby treating a FXR-mediated
4 disease in a mammal.

1 29. A method for treating a FXR-mediated disease in a mammal, said
2 method comprising:
3 administering a compound of claim 16, thereby treating a FXR-mediated
4 disease in a mammal.

1 30. A method for modulating *cyp7a* expression levels in a mammal,
2 said method comprising:
3 administering a compound of claim 1, thereby modulating *cyp7a*
4 expression levels in a mammal.

1 31. A method for modulating *cyp7a* expression levels in a mammal,
2 said method comprising:
3 administering a compound of the formula



6 wherein:
7 A² and A³ are each independently a member selected from the group
8 consisting of alkyl, heteroalkyl, cycloalkyl, heterocycloalkyl, cycloalkenyl,
9 heterocycloalkenyl, aryl, heteroaryl, arylalkyl, (heteroaryl)alkyl, aryl(heteroalkyl), and
10 (heteroaryl)heteroalkyl;

11 B³ is a member selected from the group consisting of hydrogen, -alkylene-
12 C(O)R³, -C(O)R³, alkylene-C(O)N(R³R⁴), -C(O)N(R³R⁴), alkylene-S(O)_nN(R³R⁴), -
13 S(O)_nN(R³R⁴), alkylene-N(R³R⁴), alkylene-OR³, and -C(O)OR³;

14 R³ and R⁴ are each independently a member selected from the group
15 consisting of hydrogen, alkyl, heteroalkyl, cycloalkyl, heterocycloalkyl, cycloalkenyl,
16 heterocycloalkenyl, aryl, heteroaryl, arylalkyl, (heteroaryl)alkyl, aryl(heteroalkyl), and
17 (heteroaryl)heteroalkyl;

18 X is a member selected from the group consisting of C, S, and N; and
19 the subscripts n and p are each independently an integer from 0-2;
20 thereby modulating *cyp7a* expression levels in a mammal.

1 32. A method for modulating *cyp7a* expression levels in a mammal,
2 said method comprising:
3 administering a compound of claim 9, thereby modulating *cyp7a*
4 expression levels in a mammal.

1 33. A method for modulating *cyp7a* expression levels in a mammal,
2 said method comprising:
3 administering a compound of claim 13, thereby modulating *cyp7a*
4 expression levels in a mammal.

1 34. A method for modulating *cyp7a* expression levels in a mammal,
2 said method comprising:
3 administering a compound of claim 14, thereby modulating *cyp7a*
4 expression levels in a mammal.

1 35. A method for modulating *cyp7a* expression levels in a mammal,
2 said method comprising:
3 administering a compound of claim 16, thereby modulating *cyp7a*
4 expression levels in a mammal.

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